

UNITED STATES MARINE CORPS
Basic Officer Course
The Basic School
Marine Corps Combat Development Command
Quantico, Virginia 22134-5019
B1485X

LAND NAVIGATION FINAL EXERCISE

Student Handout

1. **Congratulations!** You have completed the land navigation instruction and are about to embark on your final graded exercise. You are thoroughly familiar with the elements of map reading and are fully confident in your skills as a land navigator--right? Of course! If you carefully prepare yourself and are mentally organized the morning of the exam, you will greatly enhance your chances of passing the exam.

2. **What's In Store For You?** The land navigation final exercise is set up in a large area completely encircled by hardtop roads. The training area is more than 17 miles in circumference--about 30 grid squares in all. After a brief classroom period, you will be transported to the training area. You will be given the grid coordinate of your assigned start point, somewhere on one of the hardtop roads, and from then on it's all up to you! You will have a route card with 10 objectives and 7 hours in which to find them, in any order. It's a big job; but again, if you are organized, you can go about it in a methodical way and you will actually enjoy the experience.

3. **Terrain Associate!** The TBS land navigation program has been designed to develop, more than anything else, your appreciation of terrain. It is important to realize that long, straight lines and precise azimuths are fine when you're in a classroom or a fire direction center. But when you are guiding Marines around on the ground, up, down, over and through, you must key on terrain features. It is simply impossible to "dead reckon" with precision over difficult terrain and long distances. Another very important fact to remember is that the objectives for this exercise were not simply hammered-in at the random intersection of two azimuths. Rather, each one was carefully located on, in, or very near, some significant terrain feature. If you can just get yourself to the correct terrain feature, then to the correct portion of that terrain feature, you will find your objective--it's that simple! Remember, though, in an area of 30 grid squares there are a lot of terrain features and they often look exactly alike. With close to 200 objectives, it is easy to make a mistake. Care in plotting, terrain analysis, and pacing will pay off many times over.

4. **Organization and Attention to Detail.** When you come to class on the morning of the final exercise, you will need to bring your laminated 1:50,000 scale Quantico Military Installation; your compass; your map packet.

5. **Route Planning.** This is the crucial part--planning the detailed route which you will follow to your objectives. Always plan backward from your next objective to your present position. Pick out the best attack point for the objective, and then figure out how to get to that attack point. What you want is a sequence of known points, or verifiable points, on the ground--a sequence which will lead you right up to your final attack point and, from there, to the objective. Shortest is not best in planning this detailed route. Instead, surest is best! For example, consider the two possible routes shown in the diagram below. Which would you take?

If you are smart, you will choose route #2. Yes, it is a longer distance, but it will give you a progression of verifiable attack points (which means that you will know exactly where you are at all times) and you can walk a whole lot faster on a road or firebreak than you can in the woods. If you choose route #1, you will be attempting to go a long distance over a lot of very similar draws, which may contain dense vegetation and may offer very poor visibility. If you should become disoriented while following route #1, chances are good that you will flounder around for a long time and become increasingly less certain of yourself. You will eventually have to make your way out to the road or powerline or firebreak, not knowing exactly where on the road or powerline you are, and then try to find a verifiable point to fix your position. By contrast, the only part of route #2 which might lend itself to uncertainty is the final approach, and even it looks pretty certain. (Just find the center of the indicated finger and follow it, pacing away from the powerline.)

6. **Pacing Is Critical.** Failure to conscientiously measure distance and pace out those distances is probably the singlemost common (disastrous) mistake made by officers during the land navigation final graded exercise. You should always pace from point to point, even if you are just going from one road intersection to another. No matter how certain you are of where you are going, pacing provides insurance. If you run out of paces and you are not close to the point you expected to see, then you know it is time to stop and reconsider. Otherwise, distances can be illusory and you may just keep walking, not realizing how far you have gone, until--? There are times when pacing can be one of your most important navigational tools. Consider the diagram below:

Here, all you have to do is mark the firebreak where it crosses the ridgelines of fingers and the centers of draws. Then, by measuring and pacing from ridgeline to ridgeline, or from draw to draw, you have furnished yourself with a surefire sequence of verifiable attack points. Where the firebreak crosses the ridgeline of a finger, you can confidently expect to find the firebreak rising to its highest point, then dropping again on the other side. Where the firebreak crosses the center of a draw, it will, of course, descend to its lowest point before rising again. In this case, you simply follow the firebreak until you are as close as you can get to

your objective; then, at the proper attack point (the third finger), turn off and pace your way up the finger to the ammo can which awaits you. The same technique works for any linear feature: a road, a powerline, a firebreak, or a stream.

7. Important Considerations

a. When you choose to follow a finger or the center of a draw, there are some important considerations to bear in mind. If you have to travel a considerable distance, especially in an area with many fingers and draws, it is best to move in a draw if you are going generally downward, and on a finger if you are going generally upward. The reason is simple: if you walk up a large draw, it will probably branch off into smaller draws as you go further up. There is always the chance that you may choose the wrong branch, become disoriented, and have to backtrack. Similarly, if you travel down a large finger, it will probably split into progressively smaller fingers in front of you, presenting you each time with the opportunity to make a wrong choice. However, if you move downhill in a draw, all of the smaller draws you come to will merge, not separate, in front of you. It will be impossible to make a wrong turn. Likewise, if you walk uphill on a finger, all other branches of the finger will merge to your front. Provided that you continue to climb the highest ground in front of you, it will be impossible to take a wrong turn. There will be times when it is not practical to follow this advice, so be careful. If your point is on a large finger, away from a road or firebreak, your best bet is to get to the base of the finger and pace up the ridgeline. If your point is in a large draw, try to get to the center of the draw above the point and pace down to it.

b. If you are moving in a large draw, with widely separated contour lines, you can expect some problems. A large draw guarantees water, and widely separated contour lines guarantee flat or gently sloping ground. You can count on heavy vegetation, and perhaps marshy footing, in such an area. If you are walking down the middle of the draw, it is not necessary to walk right next to the stream. It is more effective, and a whole lot easier, to walk parallel to the stream, keeping it in sight, but keeping yourself on higher ground (perhaps ten or twenty feet above the level of the stream). Not only does this make walking easier, but it also enables you to see variations in terrain which might be totally concealed if you were moving through the heavy brush next to the water. (See diagram next page.)

c. If you are walking on a very large finger, especially if you are walking downhill, you will need to take special precautions. On a large finger, with a broad ridgeline defined by widely separated contour lines, it may become very difficult to distinguish any ridgeline at all. This situation frequently exists near a large hilltop: fingers narrow and ridgelines become much more apparent. In such a case, use your compass and follow a general azimuth. The combination of your compass and your ability to recognize terrain should keep you generally on the highest ground to your front. (See diagram below.)

8. **More on Pacing.** In situations involving large, indistinct draws and fingers, pacing becomes more important than ever. It may make the difference between successful coping and frustration. It's up to you. Bear in mind, when you pace, that pacing is just a guide. Your pace per 100m will change when you go up or down a slope, through marshy ground or dense brush, or when you are extremely tired. It will be increased by any factor which tends to shorten your stride. Really dense brush on an uphill slope can increase your pace count per 100m by as much as 30 per cent. Think of it like this: using your pace count under ideal conditions (flat clear terrain or road), compute the ideal pace count to your objective. That will give you the least number of paces you will need. If, after using up those paces, you do not see your objective, allow yourself up to 50 per cent more, depending on the extremity of your walking conditions. If you still don't see it, something is wrong, and it's time to halt your forward movement.

9. **Can't Find the Box?** If you think you are in the right spot, but you don't see an ammo can, stay calm. The first thing you should do is double-check your plotting. Many officers have "self-destructed" due to carelessness in plotting. Remember, the precise position of a point, once the grid coordinates are properly lined up on the protractor, is along the vertical black line, or where the line should be if the cutout is properly positioned on the plastic. (See diagram below.) In any case, it is the black line, not the cutout, which indicates the precise position of the plotted point.

a. If your plotted position is good, and you still think you are at the right spot, pick a nearby spot on the ground (a prominent tree, for example) and walk in a cloverleaf pattern around that spot. But keep in mind that almost every point is either on, in, or immediately adjacent to, some clearly defined terrain feature.

b. If you still have no luck, do not waste time wandering aimlessly around the area. It is likely that you have made a "parallel error" of some kind: that you are actually on a similar terrain feature, near your objective. The best thing you can do is to quickly backtrack to the last known (verified) position on your route. From that position, attack your objective again, either using the same approach, but more carefully, or a different approach. If you do this quickly and efficiently--verify your plot, backtrack to the last known position, and attack the point again--you will lose surprisingly little time; whereas, if you continue to flounder around in the woods, you will lose both time and enthusiasm.

10. **Be Aware of the Limitations of the Map.** A final warning: THE MAP DOESN'T SHOW EVERYTHING! Examine the terrain features in the diagram below. They are exactly the same in configuration and in their degree of rise and fall. Only one of them is shown on the map, though, simply because the change in elevation occurs across the 170m line. The change in elevation of the other feature is exactly the same, but it does not cross any designated contour interval and, therefore, is not picked up on the map.

a. Careful pacing and the conscientious use of verifiable positions to keep track of your progress will help prevent

confusion due to unexpected terrain features. Say that you are looking for an intersection of two draws, which on your map looks like this:

You are walking in an upward direction, up the center of the main draw, and you find this (see diagram below) a little sooner than you had expected to:

Is this your intersection of draws? No! Your pacing provided one important clue. But notice that both arms of the "Y," as defined by the contour line, are about the same size. This means that the two branches of the intersection will have about the same width and depth and will continue uphill at about the same rate of climb until a finger forms between them. Your conclusion? The little draw on left is simply a minor terrain feature which isn't picked up on the map.

b. Another important tip on distinguishing between similar terrain features: before you commit yourself by going up that finger or draw, simply orient your map (put the compass straightedge on the grid north/south line and turn the map until the compass face matches the declination diagram) and compare the feature on your map against the one at which you are looking. If they do not match, it is not the feature you thought it was. Remember, if something does not look "quite right," it probably isn't.

11. **Last Minute Jitters.** If you have any final questions about land navigation techniques, come up to the land navigation office prior to the day of the final exercise. Good luck!





